

Bunching in the Norwegian wealth tax schedule

Martin Nybakk



Thesis for Master of Philosophy in Economics

Department of Economics

University of Oslo

Submitted May 2015

Preface

First of all, I owe a great deal of thanks to my supervisor Vidar Christiansen. Not only for his excellent guidance and advice, but also for all the support he has given and patience he has shown during my work with this thesis.

Economic support from Oslo Fiscal Studies is greatly appreciated as well.

Finally I am grateful to Statistics Norway for letting me access their data. Erlend Eide Bø at Statistics Norway was a great help in getting to know the system and the data at hand, and for that I am most grateful to him as well.

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Martin Nybakk

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Executive Summary

In this thesis, I explain the concept of bunching around kink points in the tax schedule, and investigate whether such bunching may be occurring at the kink point created by the Norwegian wealth tax. I conclude that there seems to be no evidence of such bunching, after examining the distribution of taxpayers around the kink point in several ways.

Theoretically, bunching at kink points should occur when there is an increase in the marginal tax rate, as the change in marginal payoff will lead to an uneven distribution of taxpayers around the kink point. This could also be further affected by different assets being treated differently for tax purposes. I present such a model, explaining the various mechanisms that affect the amount of bunching, and explain how it can occur.

There have been other studies of bunching, with some that found evidence of bunching and some that did not. Very few such studies have examined wealth taxation, with the exception of a recent Swedish study (Seim 2012) that found evidence of bunching around a kink point created by the Swedish wealth tax. No such studies have been previously done for Norway, however.

Examining tax data for the year 2012, I observe that the distribution of taxpayers appears to have no trace of bunching, with various methods for observing potential bunching leading to the same conclusion. Furthermore, a look at the composition of wealth gave no indication that taxpayers responded to the wealth tax at all around the kink.

This is interesting given that the Swedish study did find evidence of bunching in their wealth tax schedule, and could be due to several factors. Taxpayers might have trouble positioning themselves precisely around the kink point, perhaps due to costs associated with finely adjusting the amount invested in a particular asset, or due to the fact that the tax threshold for the Norwegian wealth tax is often changing. It is particularly difficult to point to any strong reason for the different findings however, given the similarity between Norway and Sweden in most aspects related to taxation. There are some methodological differences however, that are worth taking into account, with the Swedish study being both more in-depth as well as encompassing several years of tax data.

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1. Introduction

The Norwegian wealth tax has been the subject of much controversy in recent years. Its proponents see it as an important mechanism for the progressivity of the Norwegian tax system, while the opponents of the tax argue that distortions from the tax will have a negative impact on the economy. That taxes can be distortionary is a well-established fact in economic theory, and in this study I will examine a particular form of tax distortion, bunching around kink points in the tax schedule.

Theory indicates that a change in the marginal tax rate should lead to an excessive amount of taxpayers around the kink point, more than would have been the case if there were no change in the tax rate. Other studies such as Seim [2012] and Chetty et al. [2011] have found evidence of such bunching in other countries. No such studies have been done for the Norwegian tax system however. The contribution of this study is then to investigate whether such bunching is occurring in the Norwegian tax system.

Based on microeconomic theory, I present a model framework showing how bunching might occur in the Norwegian tax system, and which that mechanism contribute to the bunching. I also present an overview of the Norwegian tax system, with particular focus on the wealth tax. Using tax data from Statistics Norway, I then examine whether there are any signs of bunching at the kink point created by the Norwegian wealth tax. Interestingly, there seems to be no indication that taxpayers change their behavior around the kink point.

After discussing some of the potential pitfalls one might encounter when measuring such bunching, I then discuss why these results seem to contradict the ones from other studies.

This paper is organized in the following way: Section 1 includes an overview of the relevant literature. In section 2 I construct a theoretical model for bunching, looking at multiple potential settings, and identifying factors that can contribute to bunching. A brief overview of the Norwegian tax system is given in section 4. The data and methods used are then presented in section 5. Further aspects of estimating bunching are discussed in section 6, before I discuss the results in section 7. Section 8 concludes.

2. Literature on Bunching.

Bunching has been the subject of several research papers. In this chapter I will try to give an overview of the research, as well as show where this paper fits into the literature.

Emmanuel Saez has been investigating bunching at kink points for some time. In a 2010 paper, he examined whether there were bunching at kink points in the U.S. income tax schedule, by analyzing micro data from 1960 to 1997. He found evidence of bunching at the very first tax bracket, where tax liability starts [Saez, 2010]. Saez has later done more research on bunching, among them a collaboration with Thomas Friedman and Raj Chetty on a 2013 paper that discovered that there were much sharper bunching in neighborhoods high in knowledge about the tax schedule. [Chetty et al. 2013]

The majority of the bunching literature has focused on personal income. As part of a larger study on tax evasion, Kleven et al. found evidence of bunching around a kink in the income tax and stock income tax in Denmark [Kleven et al. 2011]. Another study also found bunching at the Denmark's top income tax bracket [Chetty et al. 2011].

A recent study by David Seim [Seim 2012] is perhaps the study that is the most relevant for this thesis. He searches for evidence of bunching in a kink in the Swedish tax schedule. As he searches for bunching around a kink created by the taxation of wealth, like I will, and because Sweden as a country should be quite comparable to Norway, his study should be of particular interest to us. I will therefore elaborate somewhat more on this study than the others in this chapter. Seim uses tax data for 1999-2006, when there was a kink in the bracket for wealth taxation, with a marginal tax rate of 1.5% for net wealth above 900 000 SEK, and zero below this threshold. Using this data, he finds statistically significant evidence of bunching around the kink point. He is further able to separate between the assets being reported from a third party, and the assets taxpayers have to report in themselves, finding that bunching appears exclusively among the self-reported margin. Using data from military enlistment records, he also finds that persons with higher cognitive abilities respond more heavily to taxation. This indicates that taxpayers with a better understanding of the tax system might respond more heavily to taxation.

Bunching literature has not been limited to only the western economies. Kleven&Waseem looks at the Pakistani tax system, whose tax system creates discontinuity in the budget sets of taxpayers, creating large amounts of bunching on the low-tax side [Kleven&Waseem 2013]. They then use the amount of bunching to determine the structural elasticity for how individuals respond to taxation.

Another recent Swedish paper looks at bunching at a large kink point in the Swedish tax schedule with respect to labor income [Bastani&Selin, 2014]. Interestingly, they find an implied tax elasticity of zero, despite the size of the kink being quite severe. They used data sets from 1998 to 2008 to determine long-run responses to taxation, but found a lot less bunching than simulations even with small elasticities would suggest.

There has also been literature on the empirical methods associated with bunching. Michihito Ando argues that nonlinearity around the kink point might not be easily separated from the effects of the kink, especially if it is necessary to include observations not too close to the kink point [Ando 2013].

As we can see, there has been much research on bunching, but no studies have searched for bunching in the Norwegian tax schedule. We also note that the results of these studies differ; some find evidence of bunching while others do not, even for nations which would seem to be reasonably similar, Kleven et al. finds evidence of bunching in Denmark [Kleven et al.2011], while Bastani&Selin does not find evidence of bunching in Sweden [Bastani&Selin, 2014]. It is thus important to keep in mind that results between countries are not necessarily comparable. The tax rates individuals are facing, the amount of third party reporting and the agent's ability for tax evasion all might differ. So both the incentives to and the ability for individuals to alter their behavior might be different. The contribution of this thesis will therefore be to search for evidence of bunching in the Norwegian tax schedule, more precisely at the kink point created by the Norwegian wealth tax.

3. Bunching Theory

3.1 The basic model

To get a better understanding of the theory behind bunching, let us first consider the following two-period model.

There are two periods, 1 and 2. For simplicity, we have a single homogenous good, which is consumed in both periods. Consumers receive an endowment I in period 1, and have to invest an amount S in order to consume in period 2. The size of I may differ for each consumer. Let us denote the amount consumed in period 1 as C_1 , and the amount consumed in period 2 as C_2 . We use the price of the homogenous good as numeraire. The investment pay an after-tax dividend from period 1 to period 2, determined by the exogenously given interest rate r . Furthermore, we assume that there is no transaction costs in the economy.

The consumers have a utility function given by $U^i(C_1, C_2)$, where U^i is the utility function for consumer i . Note that consumers are non-identical in this model. The utility functions do have all the standard properties, however.

This gives the following budget constraints for the consumers:

$$C_1 = I - S$$

$$C_2 = S(1+r)$$

Combining these, we get $C_1 = I - \frac{C_2}{1+r}$

This again gives us the Lagrangian $L = U^i(C_1, C_2) - \lambda \left(C_1 - I + \frac{C_2}{1+r} \right)$

Maximization with respect to C_1 and C_2 yields the following optimality condition:

$$\frac{U_{C_1}^i}{U_{C_2}^i} = 1 + r$$

Where $U_{C_j}^i$ is the derivative of the utility function for consumer i, with respect to consumption in period j.

This condition shows that in order for optimum to be achieved, the amount each consumer is willing to give up of consumption in period 1 in order to consume one unit more in period 2, must be equal to the return from investing in the asset. Note that even though we have a condition for optimum, the amount consumed in each period will not necessarily be the same for all consumers, as their utility functions differ.

Now, say that the government introduces a tax on savings, t . As the government is only interested in targeting people with high personal wealth, i.e. with a lot of savings, they set the tax rate so that $t = 0$ for $S \leq S_t$, and $t > 0$ for $S > S_t$. We assume that the tax income is spent to meet an exogenously given tax requirement R . The new budget constraints of the consumers then become:

$$C_1 = I - S$$

$$C_2 = S(1+r-t)$$

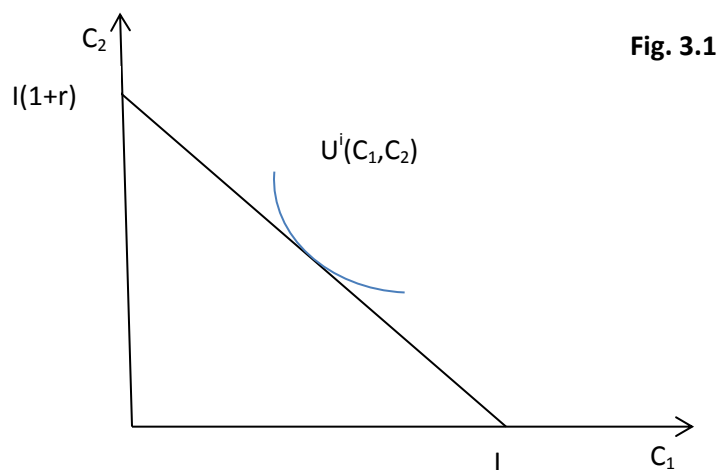
$$\text{Combining as before, we get } C_1 = I - \frac{C_2}{1+r-t}$$

$$\text{This gives the new Lagrangian } L = U_i(C_1, C_2) - \lambda \left(C_1 - I + \frac{C_2}{1+r-t} \right)$$

And the new optimality condition becomes

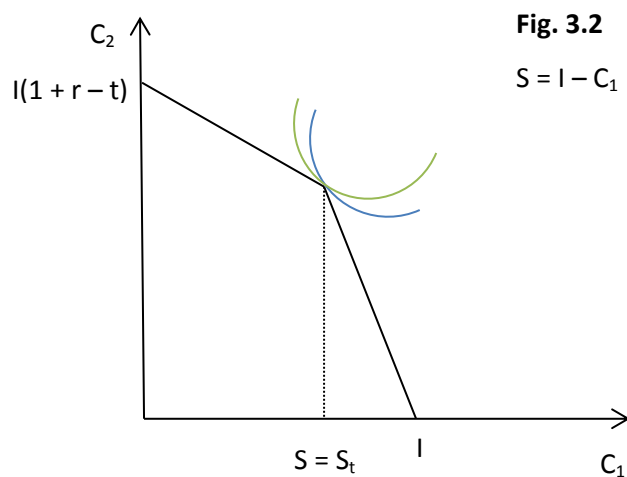
$$\frac{U_{C_1}^i}{U_{C_2}^i} = 1 + r - t$$

Not surprising, it is evident that the tax will only alter behavior in the case when $S > S_t$, and $t > 0$. To illustrate this, we can use the following diagrams:



In figure 3.1, we can see the budget line faced by the consumers. There is only one indifference curve drawn in the diagram, but there will of course be a unique indifference curve for each consumer. They will situate themselves on the budget line, based on their own preferences and differences in the initial endowment I .

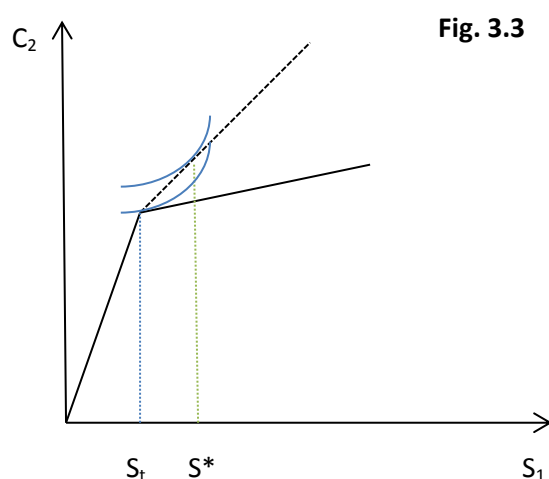
Now to illustrate the case with taxation:



The introduction of the tax creates a kink in the budget line at S_t . A consequence of this kink are that several indifference curves that would otherwise be spread out on the budget line, instead gather at the kink point. We have an example of “Bunching”.

At S_t , the tax hits, and the marginal dividend from an additional unit saved is reduced. As a result, some consumers that would otherwise have invested a little more will instead opt for increased consumption in period 1.

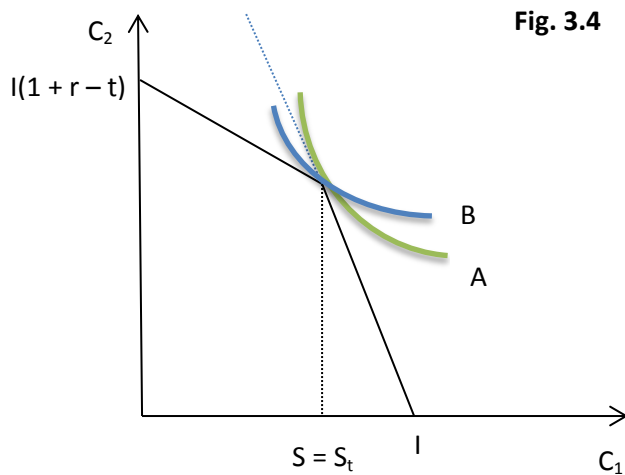
It should also be noted that the size of the kink is an important factor in determining the amount of bunching that will take place. To illustrate this, we can use the following figure:



Here, C_2 is consumption in period 2, S_t is the point where the wealth tax hits, and S_1 is the amount saved in period 1. Two budget lines have been drawn, with the dashed line having the smaller wealth tax, and thus a smaller kink at the tax threshold.

We can see how a consumer who with a smaller kink would have chosen to situate him/herself on S^* , instead will decide to move down to the kink on a lower indifference curve instead. This is how kink points lead to bunching.

In fact, the size of the kink determines how many taxpayers will bunch up there. Again, a figure to illustrate:



Here, we see two agents. Agent A has an optimal point at the kink point, and is unaffected by the tax. Agent B however, would have opted to situate his/herself on the non-tax budget line above the blue indifference curve, but gets funneled into the kink point instead.

There are alternative interpretations of this model. Here, the focus is on consumption smoothing, but we could for instance also have a multiple generation model, with consumers choosing how much to consume themselves, and how much to pass on to their children. In that case, the utility functions would simply depend on own consumption, and the consumption for the offspring.

3.2 An example with a Cobb-Douglas utility function

Now, let us look at an example with a consumer who has preferences determined by the utility function:

$$U = C_1^\alpha C_2^\beta, \quad \alpha + \beta = 1$$

Where C_j represent the amount consumed in period j . The consumer is as before given an initial endowment I , and faces the same budget constraints as earlier:

$$C_1 = I - S$$

$$C_2 = S(1+r-t) \quad , t=0 \text{ for } S \leq S_0, t>0 \text{ for } S > S_t$$

Which as seen before gives $C_1 = \frac{C_2}{1+r-t}$

This gives the Lagrangian, to be maximized with respect to C_1 and C_2

$$L = C_1^\alpha C_2^\beta - \lambda \left(C_1 - I + \frac{C_2}{(1+r-t)} \right)$$

This gives FOCs:

$$\alpha C_1^{\alpha-1} C_2^\beta = \lambda$$

$$\beta C_1^\alpha C_2^{\beta-1} = \frac{\lambda}{1+r-t}$$

Combining these, we get the optimality condition:

$$\frac{\alpha C_2}{\beta C_1} = (1+r-t)$$

This is just a concrete example of the optimality condition we have seen earlier. We see that the distribution of consumption between both periods depend on the after-tax return on investment, and how much each consumer values consumption in period 1 and 2, here represented by α and β respectively.

3.3 Taxation of Capital income

In addition to the wealth tax, investors may also face taxes on the return from capital. To show how this affects the model, let us introduce a new tax on dividends, denoted by π . This would change the consumers' budget constraints, into:

$$C_1 = I - S$$

$$C_2 = S(1 + (r - \pi) - t)$$

Using the same optimization procedure as before, we will then obtain the optimality condition:

$$\frac{U_{C_1}^i}{U_{C_2}^i} = 1 + (r - \pi) - t$$

We note that the effect on investment is the same as that of the wealth tax, with an important difference. The tax on dividends do not face a threshold like the wealth tax does, which means that it affects savings both above and below the wealth tax threshold.

3.4 Multiple Periods

The model can also be expanded to multiple periods without any loss of relevance. To show this, let us first consider a three period model, with C_i representing consumption in the respective period, and S_i the amount invested in the respective period. All our other assumptions remain the same, and we will for simplicity assume that the payoff for investment remains constant throughout all periods.

The consumers utility function is thus on the form $U^i(C_1, C_2, C_3)$, and the budget constraints are:

$$C_1 = I - S_1$$

$$C_2 = (1 + r - t)S_1 - S_2$$

$$C_3 = (1 + r - t)S_2$$

Combining these constraints, we obtain

$$C_1 = I - \frac{C_2}{1 + r - t} - \frac{C_3}{(1 + r - t)^2}$$

This gives the Lagrangian:

$$L = U^i(C_1, C_2, C_3) - \lambda(C_1 - I + \frac{C_2}{1+r-t} + \frac{C_3}{(1+r-t)^2})$$

This again gives the first order conditions:

$$\frac{\partial L}{\partial C_1} = U_{C_1}^i - \lambda = 0$$

$$\frac{\partial L}{\partial C_2} = U_{C_2}^i - \frac{\lambda}{1+r-t} = 0$$

$$\frac{\partial L}{\partial C_3} = U_{C_3}^i - \frac{\lambda}{(1+r-t)^2} = 0$$

By setting these optimality conditions equal to λ and combining, we get the optimality condition:

$$U_{C_1}^i = (1+r-t)U_{C_2}^i = (1+r-t)^2U_{C_3}^i$$

This basically says that the marginal utility lost from giving up one unit of consumption in a period, should be equal to the return the consumer would get from investing in the asset. It is also worth noting that the exponential power of the investment returns means that the distortion from a wealth tax will get bigger over time. This effect will be even greater if there is also a tax on dividends, such as in the case with taxation of capital income shown in section 3.3.

Finally, it is now evident that this will hold for any N number of periods, with a utility function

$U^i(C_1, C_2, \dots, C_j, \dots, C_N)$, with the optimality condition:

$$U_{C_1}^i = (1+r-t)U_{C_2}^i = \dots = (1+r-t)^{j-1} U_{C_j}^i = \dots = (1+r-t)^{N-1} U_N^i$$

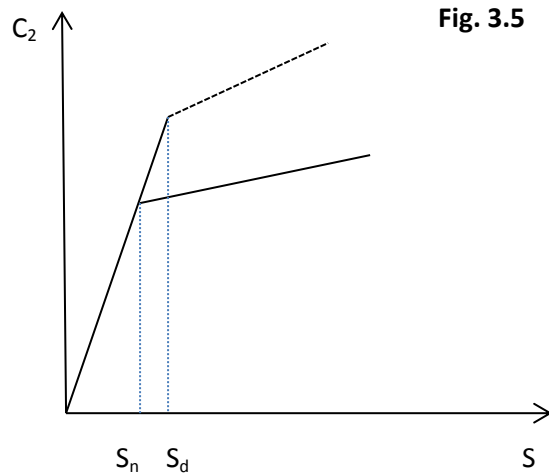
3.5 Two differentiated assets

Now say that instead of only having one asset for savings, we now have two, X_1 and X_2 .

Let $S = X_1 + X_2$ be the total amount saved, with X_1 being the amount invested in asset 1, and X_2 the amount invested in asset 2, respectively. We assume that these assets both give a payoff off $(1 + r)$ in period 2, but that the tax system treats them differently. When calculating the taxable wealth of each consumer, asset 1 is measured as X_1 invested counting as only ΘX_1 in wealth, whereas X_2 invested in asset 2 counts fully as X_2 in taxable wealth, with $0 < \Theta < 1$.

If we assume that the consumers are indifferent between the goods, they will only care about the after-tax payoff from the two assets. Differentiation will not be an issue until the amount invested reaches S_t , so only consumers who would like to invest more than S_t is affected. From that point onward, the consumers will face a tax on investments. However, this can be mitigated to some extent by changing the investment portfolio so that the consumers invest a little less in asset 2, and more in asset 1. If investment in asset 2 was to decrease by one unit, and similarly investments in asset 1 were increased by one unit, the total taxable wealth of the consumer will decrease by $(1 - \Theta)$, due to the tax schedule treating the two assets differently. As a result, consumers will opt to shift some of their investments over in asset 1. The consequence of this is that it enables more consumers to situate themselves just below or at the threshold for the wealth tax, without loss of utility. So the amount of bunching should increase.

In addition, we must keep in mind that the lighter taxation of one of the assets means that the kink in the budget line that the consumers are facing will be smaller. This will decrease the amount of bunching somewhat. To illustrate:



Here, S_n denotes the amount of personal wealth the consumer can save up before reaching the tax threshold in the no-differentiation case, while S_d denotes the tax threshold in the case with favorable tax treatment for asset 1. We see that the lighter taxation of asset 1 means that the slope of the budget line will decrease less once the threshold is reached, reducing the size of the kink (and the corresponding bunching). In addition, the opportunity to shift income will give consumers the opportunity to increase their amount of personal wealth before their taxable wealth exceeds S_t , meaning that consumers will have a more personal wealth before they are taxed, which is why S_d is located to the right of S_n in the figure. And finally, increasing the amount of asset 1 in the investment portfolio gives consumers the option to save more while avoiding taxation, which would increase bunching at the kink point.

We could elaborate on this differentiation by saying that consumers also value the assets differently. If we introduce a new variable α into the utility function, where α is the portion of savings the consumers would prefer to have of asset 1. Likewise, $(1-\alpha)$ would be the preferred portion of savings invested into asset 2. It seems reasonable that α would be different depending on the size of the initial endowment I , but it could also be different between consumers with the same initial endowment, as their preferences might differ. This means that the consumers will choose their optimal savings portfolio not only on what gives the highest payoff, but also on how much they value having savings in asset 1. Individuals

would then like to have X_1/X_2 as close to $\alpha/(1-\alpha)$ as possible. For example, if $\alpha = 1/4$, then the individuals preferred ratio of X_1/X_2 , would be $\alpha/(1-\alpha) = 1/3$.

Since α depends on the composition of investments and not directly on the amount saved, it would only have an effect on bunching through cases where there is differentiation between the assets. In this case, where X_1 is being treated favorably by the tax system, if α on average is high in the population, it would give a higher utility for the consumers from saving heavily in asset 1, which would be optimal after the tax threshold is hit. In that case, the amount of bunching is likely to decrease, as some consumers would receive more utility from crossing the tax threshold. If α is low, however, the opposite would be the case. As α is different for each individual consumer (though affected by I and the amount saved) there would only be an effect on bunching if the average value of α is either high or low. So high α would lead to an increase in the amount of X_1 in the savings portfolio, and vice versa. While it is hard to make assumptions about α , we should keep it in mind, as it is likely to affect the individuals choose to situate themselves.

3.6 Two differentiated assets with different payoff

To extend the version with two assets, let us assume that in addition to being treated differently for tax purposes, the two assets also provide a different payoff. Let us assume that the first asset, which is being treated more favorably by the tax system, has a positive, but decreasing payoff. While the second asset, which is being taxed fully, has a positive payoff that remains constant.

If we first look at this without the tax distortion, we can denote the payoff from asset 1 as $(1 + r_1(X_1))$, with $r_1' < 0$, $r_1'' < 0$. Likewise the payoff from asset 2 can be denoted as $(1 + r_2)$, with r_2 being a constant.

If the consumers have settled on a certain amount of investment, they will seek to maximize C_2 given their investment level, subject to the budget constraint $X_1 + X_2 = S$.

With C_2 being equal to the payoff from the two assets, this gives a new Lagrangian, which is to be maximized with respect to X_1 and X_2 :

$$L = (1 + r_1)X_1 + (1 + r_2)X_2 - \lambda(X_1 + X_2 - S)$$

We obtain the first-order conditions:

$$\frac{\partial L}{\partial X_1} = (1 + r_1) + r_1'X_1 - \lambda = 0$$

With r_1' being the derivative of r_1 with respect to X_1 .

$$\frac{\partial L}{\partial X_2} = (1 + r_2) - \lambda = 0$$

Combining these, we obtain the optimality condition:

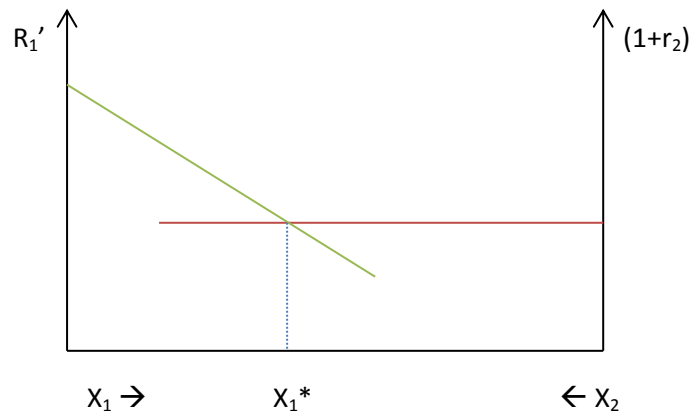
$$(1 + r_1) + r_1'X_1 = (1 + r_2)$$

Not unexpected, we see that the condition for optimality is that the marginal payoff from each asset is equal. Note that $r_1' < 0$, implying that the marginal payoff from asset 1 will decrease as the amount invested in asset 1 increase. For simplicity, let us rewrite the marginal payoff from asset 1 as R_1' , as a positive decreasing function of X_1 . We will assume that for some small amount of X_1 , $R_1' > (1 + r_2)$, to rule out some uninteresting solutions. The rewritten condition is then:

$$R_1' = (1 + r_2)$$

We can illustrate this result in the following diagram:

Fig. 3.6



We can clearly see how the consumers will initially choose to invest in asset 1, until the marginal payoff reaches that of asset 2. Furthermore, we see that this implicitly determines the optimal X_1 .

Now let us introduce the wealth tax into this model. As before, we assume that the tax system treats asset 1 more favorably, i.e. α amount of asset 1 is treated as only $\Theta\alpha$ for tax purposes, with $0 < \Theta < 1$. Asset 2 is treated normally.

Until the consumers invest enough to reach S_t , there will of course be no difference from the no-tax example. Once they reach S_t , however, the wealth tax will kick in, changing the marginal payoffs. The new payoffs will be

Payoff asset 1: $R_1' - \Theta t$

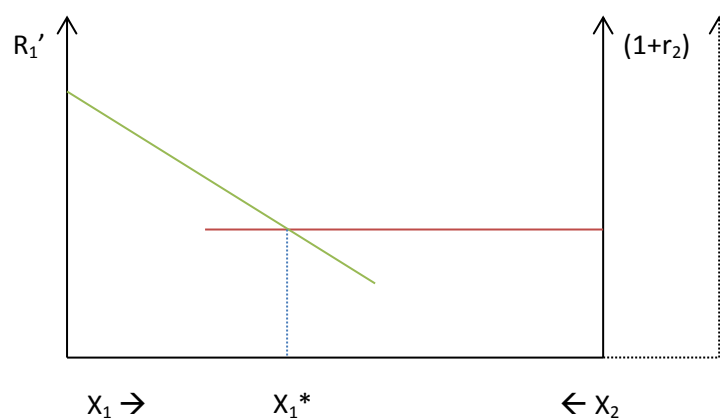
Payoff asset 2: $(1+r_2) - t$

Since we have the equality: $R_1' = (1+r_2)$ up until the wealth tax threshold and $0 < \Theta < 1$, we must have a situation at the wealth tax threshold where $R_1' - \Theta t > (1+r_2) - t$

As a result, further investment will be made in asset 1, until R_1' has decreased enough for the payoffs to once again be equal, $R_1' - \Theta t = (1+r_2) - t$, at which point further investment will be made in asset 2.

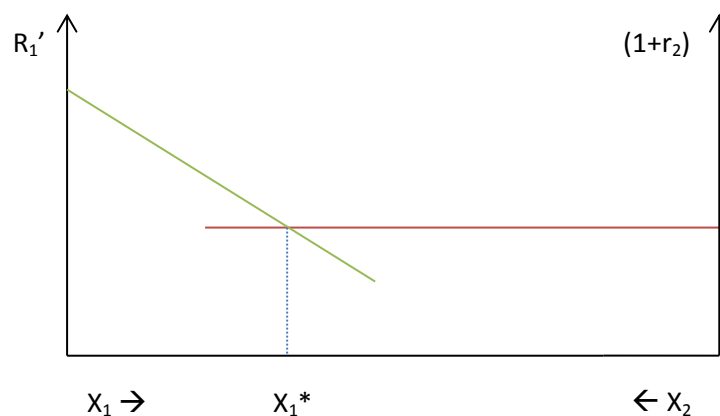
Now let us examine how taxation affects the optimum. Say that a consumer is situated somewhat below the tax threshold, and decides to save some more. This can be illustrated by increasing $X_1 + X_2$.

Fig. 3.7



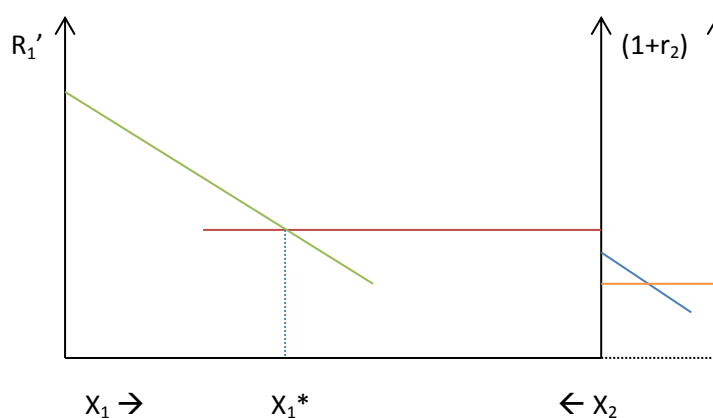
With no taxation, all the extra savings would have been invested into asset 2, as the marginal payoff of asset 2 is higher, as illustrated below.

Fig. 3.8



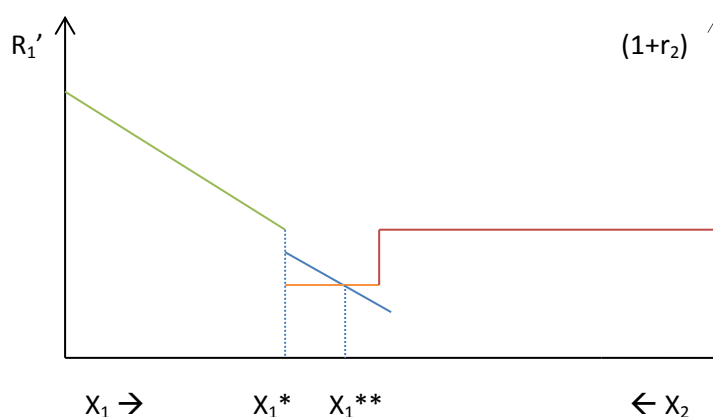
However, the extra amounts saved are subject to taxation, which gives new marginal rates for the two assets. Note how the marginal payoff for asset 2 (orange) makes a bigger shift downward than the marginal payoff for asset 1 (blue), due to the lighter taxation of asset 1.

Fig. 3.9



And finally, by merging the two bins, we get a new optimality point for the consumer as shown below.

Fig. 3.10



The new optimality point is set to be X_1^{**} in this example, but the amount will naturally depend on the amount of which the consumer would like to increase his or hers savings. We

see that any initial investment will be done in X_1 , as the lighter taxation gives it a higher marginal payoff. At some point the diminishing marginal return will make X_2 the more profitable investment option, and all further savings will be done in X_2 from that point onward.

A real-world interpretation of this model could be a tax system in which real estate was being valued more lightly than other means of saving. This would create the set of incentives we have shown above.

3.7 The two differentiated asset case on Cobb-Douglas form.

The case with different taxation on two assets can also be analyzed on the Cobb-Douglas form, as we have done earlier.

Say that we have a utility function on the form $U = C_1^\alpha C_2^\beta S_2^\gamma$

Here, C_i is consumption in period i and S_i is the amount of savings that are placed in asset i . α , β , and γ are parameters determining the utility the consumer gets, not only from consumption in each period, but also from investing in asset 2, which we can see gives the consumer some utility.

We also have the condition that $\alpha + \beta + \gamma = 1$

Furthermore, we assume that the consumer starts out with an initial endowment Y , which can be spent on either investing in one of the assets, or for consumption in period 1. We get:

$$C_1 = Y - S_1 - S_2$$

Consumption in period 2 is dependent on the amount saved, as well as the taxation of the different assets. This gives: $C_2 = S_1 - t\delta S_1 - t\delta\theta S_2$

Here t denotes the tax rate. δ is a variable that is equal to 1 if the amount saved puts the consumer above the tax threshold, and 0 otherwise. θ shows the difference in valuation for asset 2 as compared to asset 1, with $\theta \neq 1$.

If we now insert the equations for C_1 and C_2 into the utility function, we get:

$$U = (Y - S_1 - S_2)^\alpha (S_1 - t\delta S_1 - t\delta\theta S_2)^\beta S_2^\gamma$$

This again can be written on the logarithmic form, yielding the function

$$\alpha \ln(Y - S_1 - S_2) + \beta \ln(S_1 - t\delta S_1 - t\delta\theta S_2) + \gamma \ln S_2 ,$$

This can be maximized with respect to S_1 and S_2 .

The first-order conditions are:

$$\text{W.r.t } S_1: -\frac{\alpha}{Y-S_1-S_2} + \frac{\beta(1-t\delta)}{S_1-t\delta S_1-t\delta\theta S_2} = 0$$

$$\text{W.r.t } S_2: -\frac{\alpha}{Y-S_1-S_2} + \frac{\beta(1-t\delta\theta)}{S_1-t\delta S_1-t\delta\theta S_2} + \frac{\gamma}{S_2} = 0$$

Let us now first for future reference look at the case where the consumer is below the tax threshold, i.e. $\delta = 0$.

The first-order conditions then become:

$$-\frac{\alpha}{Y-S_1-S_2} + \frac{\beta}{S_1} = 0$$

$$-\frac{\alpha}{Y-S_1-S_2} + \frac{\gamma}{S_2} = 0$$

This yields the condition: $\gamma S_1 = \beta S_2$

This says that on the margin, the utility gained from investing in asset 1 must be equal to the payoff from investing in asset 2, for optimality.

The first f.o.c can be rewritten as:

$$-\alpha S_1 + \beta(Y - S_1 - S_2) = 0 \text{ This gives: } \beta Y - (\alpha + \beta)S_1 - \beta S_2 = 0$$

$$\text{And finally, using } \gamma S_1 = \beta S_2, \text{ we obtain } \beta Y - (\alpha + \beta)S_1 - \gamma S_1 = 0$$

$$\text{From the other f.o.c we then get } -\alpha S_2 + \gamma(Y - S_1 - S_2) = 0$$

$$\text{Now using our modified first condition, } \beta Y - (\alpha + \beta)S_1 - \gamma S_1 = 0$$

We get $S_1 = \frac{\beta}{\alpha+\beta+\gamma}Y = \beta Y$

This states that the optimal amount of Y to invest in asset 1, is a fraction of Y equal to the payoff from asset 1, which is β .

We already have using $\gamma S_1 = \beta S_2$, which means that using $S_2 = \frac{1}{\beta} \gamma S_1 = \frac{\gamma}{\alpha+\beta+\gamma}Y = \gamma Y$

And we see that as with asset 1, the optimal amount to invest is proportional to marginal utility gained from investing in asset 2.

Finally, for C_1 we get: $C_1 = (1 - \beta - \gamma)Y = \alpha Y$

Now let us examine the effect that taxation has on optimality. In order to do this, we assume that the consumer is in a position where $S_1 + \theta S_2 = \bar{S}$ i.e the consumer is located exactly at the tax threshold.

If we look at the differentials, we get $dS_1 + \theta dS_2 = 0$, which gives $dS_1 = -\theta dS_2$.

Since the marginal utilities must be the same in equilibrium, any initial increase in Y should be spent on C_1 , as there is no taxation of immediate consumption. At some point, however, the consumer would like to increase S as well. Let us now look at what would happen if the consumer were to increase S with 1.

We then have: $S_1 + dS_2 = 1$, which can be rewritten $dS_2 = 1 - dS_1$

Inserting this into the optimality condition, we get $dS_1 + \theta(1 - dS_1) = 0$

This again yields $dS_1 = -\frac{\theta}{1-\theta}$

Using that $S_2 = 1 - dS_1$, we obtain $dS_2 = \frac{1}{1-\theta}$

So now we have

$$dS_1 = -\frac{\theta}{1-\theta} \quad , \quad dS_2 = \frac{1}{1-\theta}$$

So we see that the different valuation of the goods incentivize the consumer into increasing S_2 while decreasing S_1 .

3.8 Taxation of capital income in a 2-asset model

To conclude our analysis of the 2-asset model, let us introduce a tax on capital income, as discussed in a previous segment. As before, there will be a tax on capital income π , but in the 2-asset case, let us assume that the tax only applies to asset 2, the one with a constant payoff.

In this case, the optimality condition for consumers wishing to invest below the wealth tax threshold will be:

$$(1 + r_1) + r'_1 X_1 = (1 + r_2 - \pi)$$

As the only change is that the right hand side gets smaller, this will lead to an increase in investment in asset 1, at the expense of asset 2, as the payoff off asset 2 is reduced.

Likewise, we get a new optimality condition above the wealth tax threshold:

$$R'_1 - \Theta t = (1 + r_2 - \pi) - t$$

And we see that also in this case, the capital tax will lead to more income shifting, from asset 2 to asset 1. In addition, we do of course have the effect of reduced overall investment, as discussed earlier.

4. The Norwegian tax system.

The Norwegian tax system makes use of a wide array of taxes, the most important of which are mentioned here. In particular, I will describe the wealth tax, as well as mention the most recent changes that have been made to the wealth tax rates and threshold.

One of the main sources of government revenue is the tax on wages and pensions. The marginal tax rate is 27% as of 2015 (Norwegian Ministry of Finance). The same tax rate also applies to income from businesses, stock revenue, and other capital income. As for dividends from shares, the Norwegian tax system uses a special rate of return allowance (rra). That is,

taxpayers get to deduct a certain amount each year, determined from year to year by the cost of the shares, and the interest rate. In the case that taxpayers take out profits below the rra, the amount that they could have deducted, but did not, will carry over into the next year with interests. This means that only profits that exceed an alternative, risk-free investment is taxed. In addition, the feature that non-realized profits are carried over with interests helps ensure that shareholders are neither encouraged nor discouraged to postpone realization of profits from shares. (Norwegian Ministry of Finance)

The rra was introduced with the tax reform of 2006, which sought to reduce the difference in marginal tax rates between capital income and wage income. Businesses are taxed as well, with a 27% tax on profits. Combined, this means that the maximum marginal tax rates for dividends from shares and wage income are very close. This is in order to reduce the incentive for income shifting. Before the 2006 reform, the differences in marginal tax rates between capital and wage income were quite severe. (Norwegian Ministry of Finance)

In addition, an extra surtax is added on top of the personal tax, when wage or pension income reaches a certain threshold. When income reaches 550 550 NOK, a 9% tax rate is levied on all income above the threshold. At 885 600 NOK, this tax rate increases to 12% (Norwegian Ministry of Finance). There is also an 8.2% national insurance contribution added on all income above 49 650.

A VAT is added on most goods and services. The normal rate is 25%, with reduced rates for certain sectors. Employers do also need to pay an employer's contribution of maximum 14.1% of wages (Norwegian Ministry of Finance).

As for the wealth tax, it is a tax on all personal wealth above a certain threshold. As of 2015, this threshold is set at 1 200 000 NOK, with a tax rate of 0.85%. Of this, 0.7% goes directly to the local government, and 0.15% goes to the central government. Both the wealth threshold

and the tax rates have undergone changes in recent years, as the threshold has been increased first from 750 000 to 870 000 NOK in 2013, and again from 870 000 to the current 1 200 000 NOK. The tax rate has also been lowered in recent years, from 1.1% in 2013, to 1% in 2014 and finally 0.85% in 2015. This has been done by lowering the central government's tax revenue. Approximately 614 000 persons paid some amount of wealth tax as of 2013, generating 13.8 billion NOK in revenue. (Norwegian Tax Administration)

Another important aspect of the wealth tax is that real estate is treated favorably when personal wealth is calculated. The taxable wealth from primary housing is a maximum of 30% of market value, and with a maximum of 72% of market value for a secondary residence. This is the maximum amount however, and on average, only 25% of the market value of primary housing is taxable, for secondary residences this number is 60% as of 2014. As a result, real estate is treated more favorably than other assets when calculating the wealth tax (Norwegian Ministry of Finance).

This effect is mitigated somewhat by the fact that the local government has the opportunity to levy a property tax, from 0.2 to 0.7% of the assessed value. This value is to be assessed every ten years. In addition, the local government may choose to use a reduction factor when assessing the properties, as well as the option to use a minimum deduction on housing. As of 2014, 341 out of Norway's 428 municipalities had some form of property tax an increase of more than 20 municipalities from 2013. These taxes generated approximately 8.9 billion NOK in revenue (Statistics Norway).

Another tax that might affect savings is the inheritance tax. This tax was abolished in 2014, but before that, in 2013, there was a tax on all inheritance above 470 000NOK, with an exemption for inheritance from spouse or registered partner. For children and parents of the benefactor, the tax rate was 6% between 470 000 and 800 000NOK, with an increase to 10% once the 800 000 NOK threshold was reached. For other recipients, the threshold was the same, but with tax rates of 8% and 15%, respectively. Due to the thresholds the

inheritance tax had a progressive effect, but was abolished in 2014. The inheritance tax might be seen as a substitution for any lacking taxation of income and profits, as the recipient do not pay regular income tax on inheritance and gifts. As the groups with the highest personal wealth receive the biggest inheritance, they also pay more in inheritance tax. This, combined with the bottom thresholds for the tax, made it quite progressive. (Norwegian Ministry of Finance)

The surtax on personal income, the wealth tax, and the inheritance tax, does all give the Norwegian tax system considerable progressivity. When discussing these taxes, distributional effects play an important role. The Norwegian tax administration makes extensive use of third-party reporting, with employers and financial institutions reporting to the tax authorities. The taxpayer is then given the responsibility to provide any missing information and correct mistakes. (Norwegian Tax Administration)

5. Data and method

5.1 An initial overview of the distribution of taxpayers

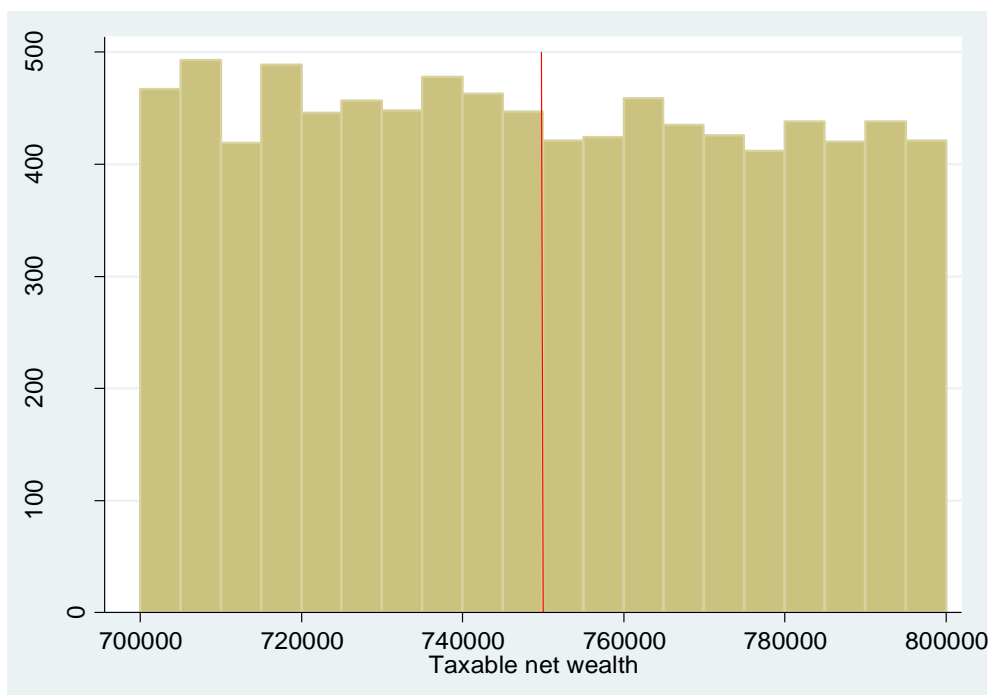
To search for possible bunching in the Norwegian tax system, I will be examining personal income statistics for 2012, provided by Statistics Norway. For this year, the wealth tax threshold was 750 000 NOK. Unless otherwise specified, the analysis is taken from a subsample comprised of one tenth of the observations, with each household given a weight of ten, to make the data easier to handle. Note that all the households with net wealth of more than 80 000 000 NOK or gross income of more than 15 000 000 NOK are always included, to make sure that the data captures the extreme cases.

The first method of order is to simply look at the data, and see how net taxable wealth is distributed around the tax threshold. To do this, we can create some histograms of taxable wealth in the range from 600 000 – 800 000 NOK, as the wealth tax threshold was at 750 000

NOK in 2012. In addition, we will experiment with different bin sizes. A small bin size will give a more precise depiction of the distribution of the data, but might also provide too much local variation, making it difficult to get a clear analysis. The entire purpose of the histogram is, after all, to gather the data point into bins in order to get an overview of the distribution. On the other hand, making the bin size too large will smooth out the distribution too much, erasing any signs of bunching.

The objective then, is to choose bin sizes that are small enough to capture most of the variation, while still being large enough to be meaningful. Here, I have opted to go for bin sizes of 5 000 and 10 000 NOK, the first one to get a precise overview of the distribution around the kink, and the second one to get a less volatile overview of the taxpayers. Furthermore, we should include a histogram covering a wider area, to get a clear overview of the distribution, in order to see if there are any trends in the distribution, kink-related or otherwise.

So first the histogram ranging from 700 000NOK to 800 000NOK, with bin sizes of 5 000NOK.
(Fig 5.1.)



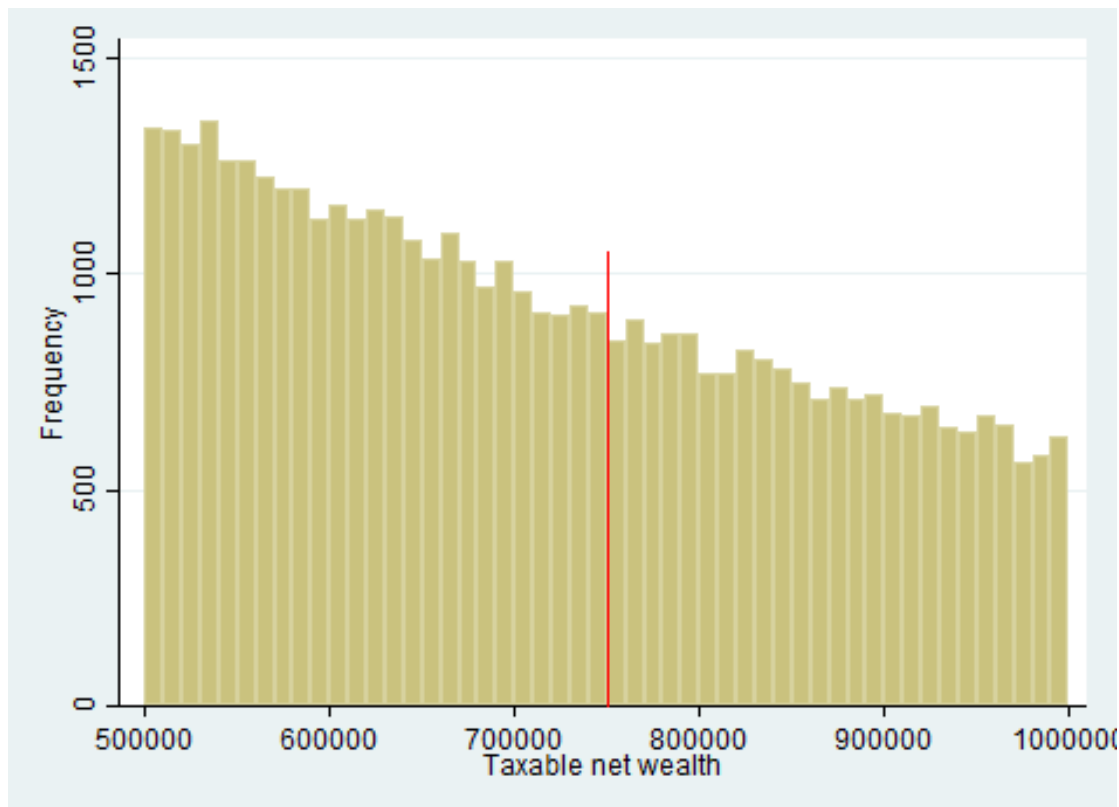
The wealth tax threshold is marked with a red line at 750 000NOK. We note that there does indeed seem to be a slight drop once we reach this threshold. The size of the drop does not seem to be very large, however, and there is some variation, which is to be expected with bin sizes as small as 5 000NOK.

Now to get some wider perspective of the distribution, let us increase the bin size to 10 000NOK, and also increase the range to 600 000NOK – 900 000NOK. **(Fig.5.2)**



Once again the slight drop is present. We do however note that there is considerable variation in the distribution of taxpayers, despite the increased bin size.

Finally we can expand our view a little further, by keeping the bin sizes the same, but expanding the range even more, to 500 000NOK – 1 000 000NOK. **(Fig.5.3)**



Naturally, we see the same drop at the tax threshold, and the same variation, as the area around the tax threshold is the same as in the previous histogram. We do note however, that the downward slope of the distribution seems to be fairly similar for this area.

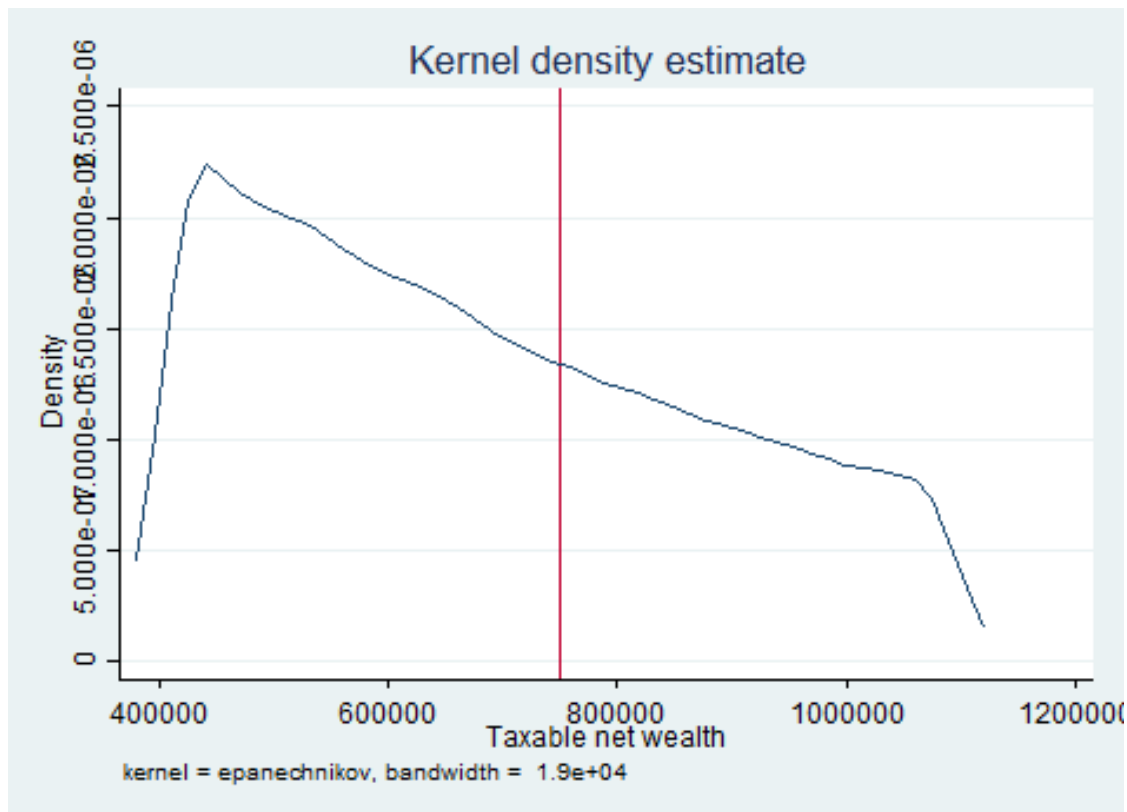
5.2 Further examination with Kernel-smoothing

So now that we have gotten an immediate overview of the wealth distribution, it seems prudent to also include a kernel density estimate of the area around the tax threshold. The kernel density estimate is similar to a histogram, but it has a couple of important differences. With a kernel, we still use bins, but they are allowed to overlap. These bins are then summarized on top of each other, creating an estimate of the distribution of the variable in question. This method smoothens out the distribution, as opposed to the sharp cutoffs we get in a histogram. In addition, a weighting function known as a Kernel is applied. The Kernel assigns the observations in each bin a weight between 0 and 1, depending on the distance from the observations to the center of the bin being evaluated. Again, this is different from a histogram, where each observation is given a weight of either zero or one, depending on whether or not it is inside the bin being evaluated. An advantage of using the kernel method

is that the smoother density function might make it easier to spot any excess mass around the tax threshold, as we no longer have to deal with the edges of the histogram bins. This is particularly relevant in this case, as the distribution of taxpayers is downward-sloping. This means that we will likely have a slight drop at the threshold when we go from one bin to the next. And if we take a look back at figures 5.1-3., we see that this is indeed the case. A smoother distribution should therefore make things clearer. This feature also makes it so that the estimate isn't dependent on the end point of bins like a histogram, which removes a potential source of error.

When using Kernel-smoothing, there are a variety of kernel formulas to choose from, depending on our assumptions of the data distribution. Here, I choose to use the Epanechnikov kernel. This is a commonly used Kernel with the basic properties, and there is nothing in the distribution that should indicate that some of the more special Kernels would fit the distribution better. The other most commonly used Kernels, such as the Gaussian Kernel, is also quite similar to the Epanechnikov Kernel, so the choice of Kernel should not impact our result in any meaningful way in this case.

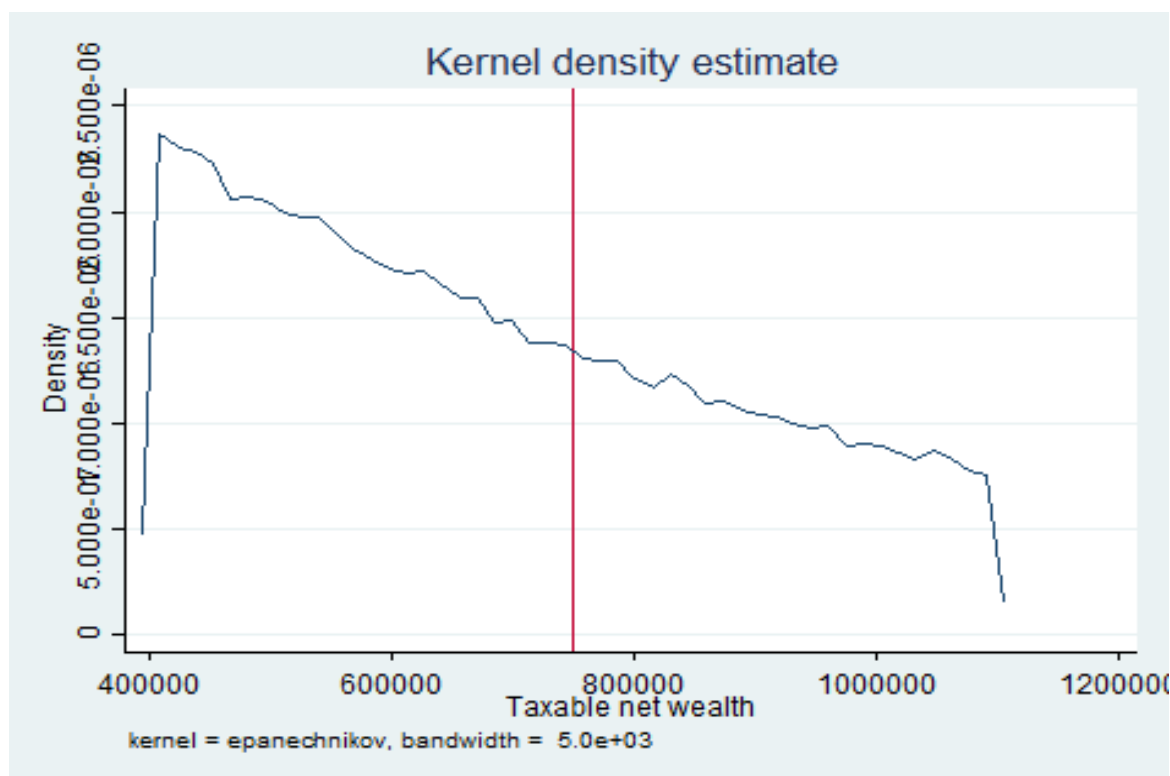
One of the most important factors for the kernel density estimate however, is the bandwidth we use. Like a histogram, the bandwidth will determine the precision of the distribution, but a small bandwidth comes at the cost of reduced smoothness. First, let us try the common method with the standard bandwidth, calculated by STATA to minimize the square errors if the data were uniformly distributed. This method yields the following: **(Fig. 5.4)**



Here, we end up with a bin size somewhat larger than the ones we used in the histograms, at 19 000 NOK. As before, the tax threshold is marked with a red line. The drops on each end of the estimate are simply a result of the range cutoff, and do not bear any significance whatsoever. They are simply a consequence of looking at a subsample of the dataset. The first thing that strikes us when looking at this estimate is that the distribution seems to be quite even. The smaller notches we had from the histogram are gone, and while there are some slight bumps here and there, it seems clear that there are no visible sign of bunching in this estimate.

It seems evident that the density function appears smooth, with little sign of any excess mass around the kink point. Note, however, that this bandwidth may not be the best one. The width may for instance be too wide, which will smooth out the density too much. With no sign of bunching in the previous figure, it would of course be pointless to smooth out the distribution even further. In order to exhaust all possibilities however, it might be worthwhile to try an estimate with a somewhat smaller bandwidth, like we did with the

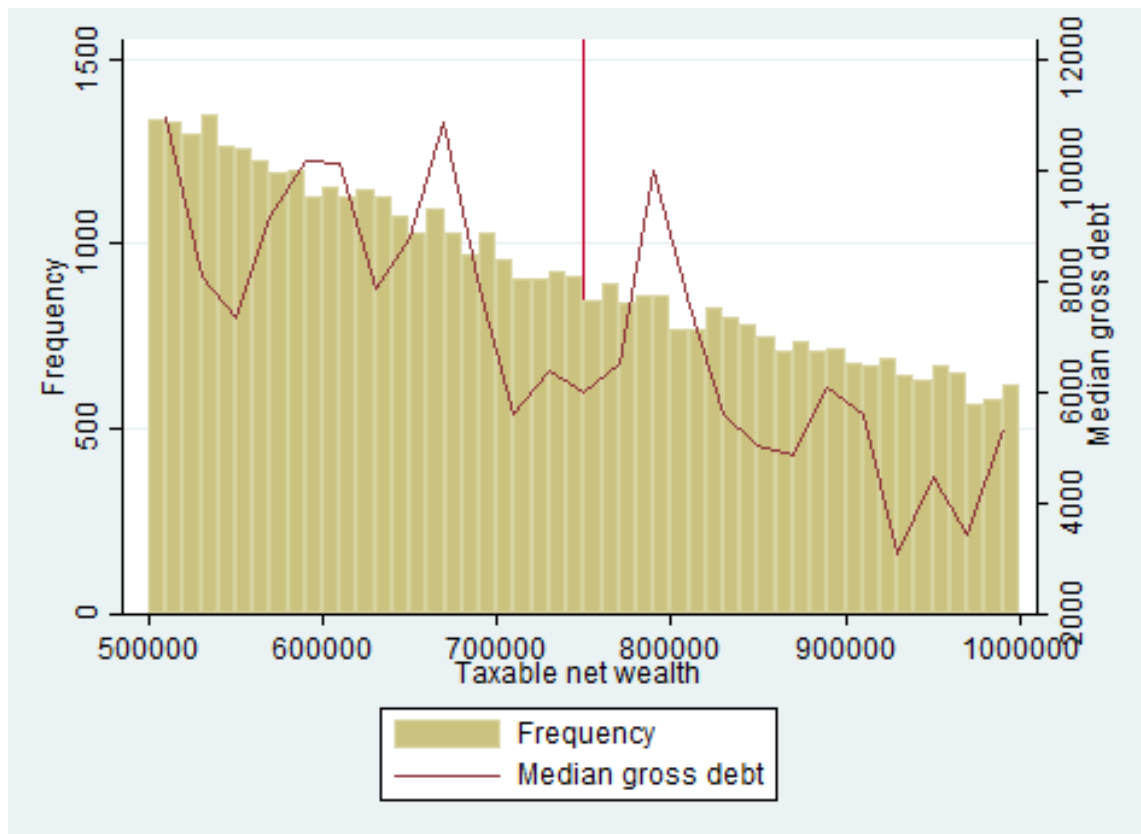
histograms. In figure D, we have a bandwidth of 19 000 NOK. If we now try again with a bandwidth of 5 000, we get the following: (Fig 5.5)



Here, we get a lot more local variation. There are still no big signs of excessive bunching, though, even in this case with smaller bins. Even the most uneven areas of the estimate are not very large, and more importantly, they are not located at the tax threshold. Like in the previous figure, this is what we would expect the distribution to look like without bunching.

5.3 Fluctuation of gross debt

Finally, in addition to examining the distribution of taxpayers, it might be prudent to also have a look at some other factors that could be affected by wealth taxation. For instance, we can try to examine the composition of the assets for taxpayers around the kink point. If taxation is affecting taxpayers, changes in how they save might be indicative of this. For starters, let us have a look at how gross debt fluctuates around the tax threshold: (Fig 5.6)



Here we have the same wealth distribution as before, now expanded to a range from 500 000 NOK to 1 000 000 NOK, as we are examining not just a kink, but a somewhat larger pattern. The red line drawn across is the median gross debt of taxpayers, calculated at a 10 000 NOK interval. For every 10 000 NOK bin the median gross debt is calculated, and these points are then plotted across the distribution. As we can see, there is quite a lot of variation in the amount of debt among the taxpayers. It is also worth noting that median debt on average seems quite small compared to the wealth of taxpayers. While we still have a downward trend, we note that we have a few spikes both before and after the tax threshold. If there were for example a sharp increase before the tax threshold, it could have been indicative of taxpayers adapting to taxation. There does not seem to be any such break here, however.

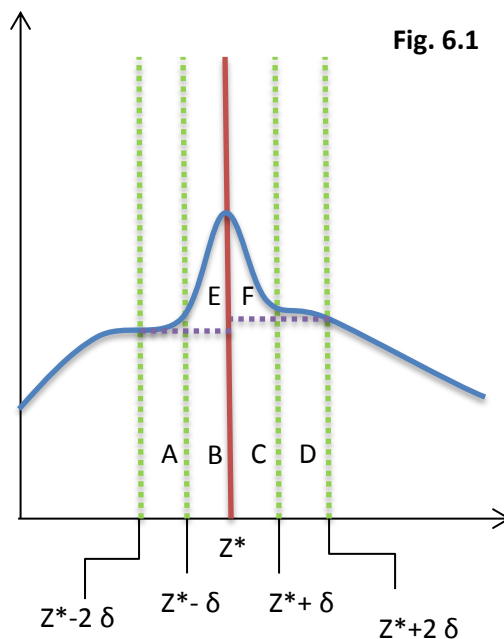
6. Further bunching estimation.

In addition to the nonparametric estimation done in the previous chapter, there is also more advanced techniques one could utilize in order to detect excess bunching. The key word in

this case, is excess. We need to get an idea of what the distribution of taxpayers would look like without the kink, in order to determine whether or not there is any extra mass around the tax threshold. In other words, we must construct a counterfactual that shows how taxpayers are distributed in the absence of a kink. In this case, that would mean in the absence of wealth taxation.

One of the simpler methods for doing this is one used by Emmanuel Saez (Saez, 2010). Saez defines a band around the kink point, and then two more bands surrounding it, which combined has the same size as the band around the kink point. He then obtains an estimate of excess bunching by calculating the difference in the amount of taxpayers between the two surrounding bands combined, and the band centered on the kink point.

More precisely, we define the kink point as Z^* , and the amount of taxpayers in a band around the kink point as $(Z^* - \delta, Z^* + \delta)$. The amount of taxpayers in the two surrounding bands will then be $(Z^* - 2\delta, Z^* - \delta)$ and $(Z^* + \delta, Z^* + 2\delta)$, respectively. Here, the parameter δ determines the width of the wealth bands. To illustrate, let us look at the following figure, similar to one used in Saez, 2010:



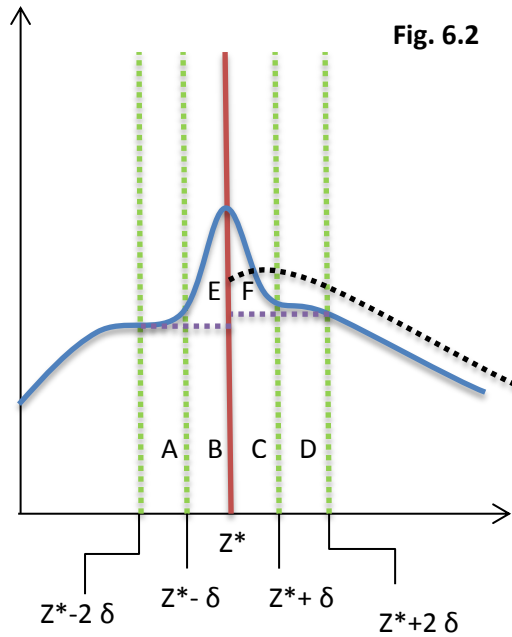
Here, the tax threshold is denoted with a red line, with Z^* as the kink point. The blue line denotes the distribution of taxpayers, and the green dotted lines shows the width of the bins that we use, denoted δ .

The extent of excess bunching will here be calculated by summing up the amount of taxpayers in the area from $(Z^* - \delta)$ to $(Z^* + \delta)$, in this case that is $B + E + C + F$. Then we subtract the amount of taxpayers in the two outer bands, from $(Z^* - 2\delta)$ to $(Z^* - \delta)$ and from $(Z^* + \delta)$ to $(Z^* + 2\delta)$. In the figure that will be the areas A and D. The excessive bunching in this example will then be the areas E and F.

The amount of taxpayers in the two surrounding bands serves as a counterfactual, and without the kink we would expect the amount of taxpayers around the kink to be approximately the same as in the two surrounding bands. So any excess amount of taxpayers around the kink might be attributed to bunching.

Note that this method takes into account that taxpayers might be unable to perfectly control their wealth, by extending the band to cover an area above the tax threshold. This inability might come from a number of factors, for instance variance in income making it difficult to predict ones future wealth with sufficient precision, or measurement errors in the data. If indeed taxpayers were unable to perfectly control their placement in the tax bracket, we would expect the excess amount of taxpayers to extend above the tax threshold as well, which is then accounted for by this procedure. This method does give us a simple way to estimate a counterfactual for taxpayers in the absence of a kink point, but this somewhat straightforward method does unfortunately also come with a few weaknesses.

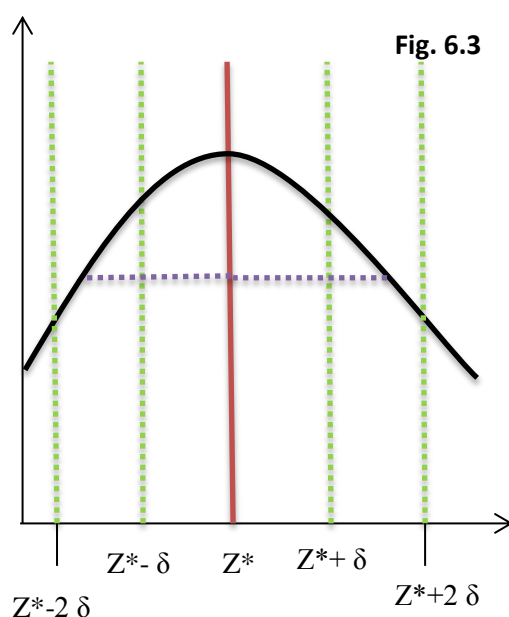
Something that is not taken into account in the previous figure is that the extra mass around the kink point is taken from the distribution of taxpayers on the right-hand side of the kink. The amount of taxpayers on the right hand side is therefore smaller than it would have been without the change in tax rate, which again will lead to an overestimation of bunching. To illustrate, let us have a look at the following figure:



Here, we have the same notation as in figure G, with a new black dotted line to illustrate the distribution of taxpayers to the right of the kink without a change in the tax rate. To the left of the kink this will of course be the same as the distribution with a change in the tax rate, up until the point where bunching starts to occur. Now the issue that arises is the fact that using the areas to the right of the kink as a counterfactual, area D in this case, will not give a good estimate of the amount of bunching in the absence of a kink. This is due to the fact that the amount of taxpayers in area D would have been higher than in the case with a kink. This again is what might lead to an overestimation of the amount of bunching.

This issue has been remarked upon by Chetty et al. (2011) and Bastani&Selin (2014). Their solution is to shift the area to the right of the kink point upwards, until the area under the counterfactual matches the area under the actual distribution of taxpayers. By applying this constraint they counteract the effect shown in Figure H, eliminating a possible source of error.

Another potential issue that might arise when estimating excess bunching is if the distribution of taxpayers is nonlinear around the kink point. When we use the areas around the kink to construct a counterfactual, we naturally have to make assumptions about the shape of the distribution of taxpayers around the kink. To illustrate, have a look at the following figure, focusing more closely at the area around the kink point:



Here we can clearly see how the counterfactual, denoted as the area below the purple dotted line will be biased if the distribution is nonlinear at the kink. If the distribution is convex we will have an overestimation of bunching, or underestimation if the distribution is concave.

In order to deal with these problems, another method is often used, as explained in Chetty et al. (2011). There, they construct a polynomial to better fit the counterfactual. They exclude the area under the kink, as the counterfactual needs to be crafted from the distribution unaffected by the kink point. They then define the excess mass as the difference between the observed mass at the kink area and the counterfactual, as previously shown.

Ando (2013) also addresses this issue, showing nonlinearity in the distribution can affect regression estimates made around the kink point. This also applies if there is other sourced of noise around the kink point, of course. He finds that this effect can be counteracted

somewhat by using a very small bandwidth or a more advanced polynomial, but this then comes with a cost, such as high variance or low explanatory power.

As there seems to be no visible sign of bunching in our dataset, applying these methods on the data would be somewhat excessive. We can use the aforementioned methods to try and determine whether bunching is excessive or not, but when there is no bunching to be found, the conclusion seems clear. The previous chapters have shown how economic theory indicates that there should be some bunching, so this leaves us with the question of why there seems to be none.

7. Discussion of results

The apparent lack of any bunching is surprising for two reasons. Firstly, it contradicts the microeconomic theory outlined earlier, which indicated that the tax threshold should incentivize bunching at the kink point. Further, there have been studies that have indeed found evidence of such bunching. In this chapter I will therefore try to come up with some plausible explanations for why we can find no such signs in this study.

There are some studies that have found evidence of bunching. Saez [Saez 2010], Kleven et al. [Kleven et al. 2011], Chetty et al. [Chetty et al. 2011] and Seim [Seim 2012] all found evidence of bunching at various kink points. On the other hand, Bastani & Selin [Bastani&Selin 2014] did not find any sign of bunching in their study. As the results vary, it may be worth looking at similarities and differences with the other bunching studies.

Most other studies have examined kinks in the income tax, with some studies finding evidence of bunching. With tax rates for income being significantly higher than the tax rates for wealth, the incentive to adjust your income at the kink point may be stronger. Most people are not fully able to freely choose their working hours however, which would limit people's ability to adjust their income. While adjusting one's personal wealth is not subject to such limitations, there are some constraints that consumers face. If they would like to invest somewhat more in another asset after encountering the tax threshold, for instance

real estate, they may not be able or willing to do so with sufficient precision, as they may have trouble finding real estate in the sufficient price range. Another point worth noting is the fact that in the acquisition of real estate, other factors than price does play a significant role, which may further limit this assets attractiveness as a tool for wealth adjustment, at least with regards to positioning oneself around the kink point.

A study of particular interest to us is of course the study most similar to our own, Seims study of bunching at the wealth tax kink point in Sweden [Seim 2012]. As the study is examining the same tax as this one, as well as Sweden being quite similar to Norway, the results should perhaps be more comparable than the other studies, which mainly focus on income taxation. With a tax rate of 1.5% in Seims study, the tax schedule of Norway and Sweden do seem similar to each other. As Seim do find evidence of bunching, it therefore seems unlikely that differences in tax schedules are the reason for the different results.

Another element that may explain the apparent lack of bunching may be the fact that the tax threshold for the wealth tax has varied greatly over the last few years. This has been due to a great deal of political debate over the tax, as well as adjusting for the general price level. The wealth tax threshold has increased from 470 000 NOK in 2009, to 750 000 NOK in 2012. It may very well be that these rapid changes have negatively affected the consumer's ability to adjust around the wealth tax threshold. However, the tax threshold in Seim's study was also raised several times during the years encompassed in his study, which seems to indicate that this is unlikely to be the sole explanation.

It might be natural then, to see if there could be differences in how the tax system is enforced, particularly since Seim finds that a significant amount of the bunching in his study stems from tax evasion. The amount of third-party reporting seems to greatly affect the consumer's ability to evade taxation, so differences here might help explain the differences we have found. The similarities between Norway and Sweden are significant also in this area, however. In both countries the net wealth which was the basis for taxation was calculated at the end of the year, and in the spring the following year it is up to the taxpayer to correct

any mistakes, and report any missing assets [Norwegian Tax Administration]. Most assets are subject to third-party reporting, but there are some assets which rely mainly on the taxpayer, such as assets abroad, motor vehicles, boats or large amounts of cash. Seim does not only find a tax evasion response to the wealth tax, but finds that bunching occurred only among the self-reported assets. However, we are unable to discover any major difference in the enforcement of the tax schedule that could explain such different results.

Finally, and perhaps most important, there are of course methodological differences between this study and other studies of bunching. It is worth noting that we have only had the opportunity to examine the distribution of taxpayers for one year, 2012, due to limitations in the available tax data. Most other studies have aggregated the distribution over several years, greatly expanding the amount of available data. This method does have several benefits that this study does not, such as being less susceptible to random outliers. The increased amount of data points will also make any bunching easier to spot, as small amounts of bunching in each year will add up as you aggregate the data. This also has the extra benefit of also including possible long-term responses to taxation, as it is possible that while there will be small amounts of bunching some years, there will over time be some amount of bunching at the kink point.

8. Conclusion

In this study, I have outlined a framework for how economic theory indicates that kink created by a change in marginal taxation might lead to taxpayers bunching around the kink. With the Norwegian wealth tax having such a kink point, this should then lead us to expect bunching of taxpayers around the tax threshold there. I have then used tax data from Statistics Norway for the year 2012, and tried to detect any sign of such bunching in the distribution of taxpayers.

Every examination of the available data has showed the same result, that there are no visible signs of bunching around the kink point created by the wealth tax. This is the most important finding in this study, and together with our brief look at the fluctuation in gross debt, our

conclusion does inevitably have to be the one that all our results are of the kind we would have expected if there were no change in the marginal tax rate at all.

These results are somewhat surprising, given that there are multiple studies from other countries that have indeed uncovered evidence of bunching. Most notably in our case is the recent study by David Seim, which found evidence of bunching at a kink point in the Swedish wealth tax schedule. Sweden and Norway are similar in quite a few aspects, and this is also the case when it comes to the design of the wealth tax and enforcement of the tax, so it is not obvious why the results would be different. The size of the kink and the enforcement of the tax code are very similar in the two cases. And even though the threshold for the Norwegian wealth tax has been changed in recent years, the same was happening in the years that Seim is studying. There are some differences in methodology, however. Seim's study examines several years' worth of taxpayer data, which of course gives his study somewhat more robustness towards random variations. We can then not categorically exclude the possibility that our year of study, 2012, was some special outlier, but as far as the tax code goes, there is nothing to suggest that this should be the case.

Further studies in this field might want to examine how taxpayers are affected in the long term. This would allow for investigation of more-long term responses to the wealth tax. There is also potential interest in investigating whether the different treatment of assets might be affecting taxpayer's behavior, as discussed in the theoretical part of the thesis. One of the things that make tax research so exciting is precisely the way it affects a great number of people, often in ways that might not immediately seem obvious.

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